

Wealth Distribution and Economic Activity: A Kaleckian Extension

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Resumo

The proposed model has three classes, two of workers and the capitalists. One of the workers is high skilled and earns a higher wage. Just like capitalists, who also have a positive propensity to save out of disposable income, high skilled workers accumulate wealth as public bonds, which provide financial income as interest, and as money. Wealth can impact aggregate demand on four ways: i) consumption out of wealth; ii) government expenditure out of wealth taxes; iii) consumption out of financial income; iv) government expenditure out of financial income taxes. In short run, the paradox of thrift holds, while the paradox of costs could hold or do not hold. In long run the paradox of thrift and the paradox of costs do not hold, despite the model is demand-led.

Palavras-chaves: kaleckiano, modelo kaleckiano, riqueza, Distribuição de Riqueza, crescimento econômico

1 INTRODUCTION

In according with Piketty e Zucman (2015) the wealth inequality started to rise, in most developed countries, in the 80s. In France, although the value is still far from its peak, the first centile of income has approximately 25% of total wealth, while the richest 10% possess more than 60% of it. This value is too high, especially when compared with income inequality since this same decile appropriates ‘only’ 30% of the labor income. Therefore, it is increasing the difficulty to forget the wealth distribution since the ratio wealth-income is raising. Garbinti, Goupille-Lebret e Piketty (2017) highlighted the importance of others ways to introduce wealth. In France, The financial assets represent 35% of total wealth, a rise of 75% compared to the 70s.

In Brazil, financial wealth in 2015 was around 35% of GDP, according to data from Anbima. This represents a 9% growth, when compared to the previous year. However, this wealth was highly concentrated. About a hundred thousand people had a per capita wealth of approximately U\$ 1,5 million and five million people held per capita U\$ 29 thousand in financial wealth. The remaining sixty-six million households had, per capita, a little more than U\$3 thousand.

From this perspective, wealth becomes essential to grasp how the Brazilian economy has behaved in the past fifteen years. It allows one to modify, for example, one of the most controversial topics of the period: the reduction of income inequality. By using the PNAD data, the Gini index on total income points to a decline from 0.57 in 2003 to 0.52 in 2014. Nevertheless, when computing income over wealth, the result is different. Using data from the Individual Income Tax Declaration (IITD), which are more complete than the PNAD for income of the richest range, Medeiros, Souza e Castro (2015) recalculate the Gini coefficients in the period 2006-2012. That Index rises in the first three years and then has a smooth decrease in the last three years, remaining stable in the period.

Medeiros e Castro (2016) explain this phenomenon as having its origin in the concentration of wealth. Although there has been improved in the distribution of wages in wages, as the PNAD data indicate, the income from wealth has been concentrated. At the beginning of the period, the richest decile of the population appropriated approximately 20% of this type of income¹. In 2012, this decile started receiving 30% of capital income, indicating a worsening in the distribution index of income over wealth. This topic becomes even more relevant due to the lack of policies for the deconcentrating of the Brazilian tax burden as highlighted by IPEA (2011), Salvador (2017) and Silveira et al. (2013).

In United States, According to Tavani e Vasudevan (2014), Taylor, Omer e Rezai (2015) and Piketty et al. (2017), an increase in poorest wages and richest taxes has a little impact on income utilization. It occurs because the first decile of the population's income is profits and dividends. Thus, in order to increase the income inequality, it is important to decrease the wealth inequality.

Then, this paper will develop a neo-Kaleckian stock-flow-consistent (SFC) model which incorporates wealth and wealth distribution as well as its allocation as crucial economic factors. In doing so, this article proceeds as follow: In section 2, we document a literature review, showing some models that include wealth and its distribution. In section 3, the accounting framework is shown. In section 4, we develop our model. In section 5 and 6 the short-run and the long-run solutions, respectively, will be discussed. In the latter, some simulations are developed in order to help the effect of different shocks on utilization, on wealth distribution and on income distribution. At last, in section 6 will be discussed the results.

¹ The income from this kind of wealth in this paper are profits, dividends, income from firms, capital gains, financial assets, inheritances and donations. Rents are not included.

2 REVIEW OF LITERATURE

2.1 The Kaleckian Literature

The Kalecki (1954) theory of distribution theory is a model which prices are determined by a mark-up (Trigg (1994)). If the mark-up rises, the capitalists' share of income increases. Then, as Kalecki believed that income equality is one of the three ways to full employment (Kalecki (1944)), the mark-up is essential to understand the economic activity.

The Kaleckian investment theory was developed by Rowthorn (1981) and Dutt (1984a), supposing an investment function Kalecki-Steindl, which is a positive function of animal spirits, of the level of profits and of output. This theory leads to two results: the paradox of thrift¹ and the paradox of costs. The first indicates that an increase in the propensity to consume rises the output, an opposite of neoclassical models. Since the model is demand driven, the increase in the propensity to consume expands the consumption, and then the output. The latter implies that an increase in wage share rises utilization and rate of profits. In accordance with Lavoie (2014), this result is the most puzzling in Kaleckian theory. From the point of view by an individual firm, higher wages implies lower profits. However, since higher wages rises consumption, utilization also increases and consequently the aggregate profits.

However, there are two ways in Kaleckian literature which question the paradox of costs. Amadeo (1987) introduces a workers' propensity to save positive, while Bhaduri e Marglin (1990) modify the investment function. In accordance with these authors the investment function should be related with the profits share, an opposite of profit rate in Rowthorn (1981) and Dutt (1984b). In accordance with them, it is possible to have a constant profit rate, combining rising in the capacity of utilization and decreasing in the profit share. However, the fall in the profit share ought to have a negative impact on investment. In doing so, on one hand, the rise in the proportion of wages in total income increases the consumption and, consequently the demand. On the other hand, the fall in the profit share decreases investment. If the first is stronger than the latter the economy is wage-led demand. In contrast, an economy that investment effect is higher than a consumption effect is profit-led demand. Besides that, whenever the economy is profit-led demand the growth will be profit-led.

2.2 Wealth in Economics

Ando e Modigliani (1963), in their life cycle hypothesis, believe that families accumulate wealth in order to consume it since families want to hold the consumption stable. Then, unexpected increases in their wealth lead to a rise in their consumption. From the point of a institutionalist view, the consumption out of wealth is a consequence of conspicuous consumption (Ve-

¹ This result can also be found in neo-Keynesian literature (Lavoie (2014))

blen (1988)). In accordance with Duesenberry (1949), consumption has a social significance, i.e., individual makes an unfavorable comparison of his living standard with that of someone else. Then, families spend out of wealth to raise their consumption.

Galor e Zeira (1989) develop a model that human capital investment is the way that families can earn a higher income. However, if their wealth is not high enough, they will not invest. In Dutt (2011), wealth is introduced by a debt that workers can take in banks to consume. Then, in short-run, the debt increases the consumption, while in long-run the interest transfer income from workers to capitalists, decreasing the demand. Besides that, the debt can impact the stability of the system. Bhaduri, Laski e Riese (2006) also includes the possibility of debt and introduce the wealth in investment function. In their model, investment is a positive function of wealth since it reduces the financing risk.

Brochier e Silva (2018) develop a Stock-Flow-Consistent model with the supermultiplier (Serrano e Freitas (2017) that families hold public bonds and consume out of this wealth. Ryoo e Kim (2014) introduces the housing wealth. This kind of wealth rises workers' net wealth, increasing their capacity to take credit.

With regard to the empirical papers, Ludvigson e Steindel (1999), Mehra (2001), Davis e Palumbo (2001) and Lettau e Ludvigson (2004) indicate that a rise in one dollar of families' wealth increases their consumption between 3 and 5 cents. Altissimo et al. (2005) show that the financial wealth has a higher impact on consumption than housing wealth, while Catte et al. (2004) suggest the opposite.

2.3 Post-Keynesian works with wealth distribution

According to Kalecki (1954), workers have a propensity to consume equal to the unity. Then, although in the short run it is possible that workers own some wealth, in the long-run the total wealth will belong to capitalists. In other words, if the workers do not have a positive propensity to save, the study of the personal distribution of wealth does not make any sense. Then, it is necessary to change this assumption in order to study the wealth concentration.

This modification was made by Pasinetti(1962). In this model, the workers own capital stock since they have a positive propensity to consume. However, the workers' decision to save do not impact the income distribution and the profit rate. Then, workers can impact the proportion of profits that they will earn because they can increase their share of wealth, increasing their savings. Nevertheless, they do not influence the total profits in the economy.

Recently other authors developed this question in the post-keynesian framework. Palley (2012), Palley (2016) and Dutt (2016) maintained a model with two classes, but workers save a proportion of their income. Then, this subsection will present three models in which workers have a positive propensity to save, as well as the effect of variables exogenous in each model.

Palley (2012) develops a neo-Kaleckian model with two classes, without government and international market. The workers earn wages and profits, while capitalists earn profits and a portion of the wages as managers. In this economy all wealth is capital stock, and then the proportion of the profits that each class receives from firms is the portion of capital-stock-wealth that each class owns. Besides that, both classes have propensities to consume out of income and out of wealth positives, and workers' propensities are higher, considering the Kaleckian assumptions.

In the short-run, an increase in the share of capital stock by workers has two positive effects on aggregate demand: First, the consumption out of income rises, because of the income of workers increases. Second, the consumption out of wealth also rises. Additionally, higher propensities to consume also increase the demand, i.e, the paradox of thrift holds. As Amadeo (1987), rises in wage-share can rise or drop the demand.

The long-run is determined when the share of wealth held by workers is constant. If the economy is wage-led demand, any increase in profit share will decrease the demand, the capitalists' ownership share and the profit rate. When the economy is profit-led demand, the reverse occurs. In addition, an increase of capitalists' propensities to consume rises the demand, but drops their ownership. Finally, an increase in workers' propensities drops their ownership, but increases the rate of utilization, in an opposite of Pasinetti (1962).

Palley (2016) aims to understand the causalities between wealth distribution, income distribution and output growth. Besides that, he changes Palley (2012) in two ways: first, the investment function is a matchup of both neo-kaleckian and post-kaleckian investment functions (Rowthorn (1981) and Bhaduri e Marglin (1990), respectively). Second, the wealth just impacts the consumption indirectly, i.e., households' propensity to consume out of wealth is equal to zero. In the short-run, an increase of the capitalists' wage bill drops the demand, since their propensity to consume is lower than workers'. The other results are the same as the Palley (2012).

In the long-run the outcomes are different. A rise of capitalists' propensity to consume increases the utilization and it is unknown what happens with their ownership share. A rise of workers' propensity to consume increases the utilization but their wealth share falls, an opposite of Pasinetti (1962) theorem. In other words, workers are able to raise their portion of wealth, but it comes with falls in economic activity. A surge in capitalists' wage bill decreases the utilization and rises the wealth concentration in their hands. Finally, an increase in the proportion of income profits has an ambiguous effect. On one hand, if the economy is profit-led, the capacity utilization increases. On the other hand, if the economy is wage-led, the capacity contracts. The outcome of wealth distribution depends on others variables.

Dutt (2016) develops a model with two classes: the top income recipients and the rest. Both earn from wages and some flows of capital. The rest receives income from property at the

exogenous interest rate, while the top receives capital income in two ways: dividends from the profits and, as financiers, lending to firms with a higher interest rate. This second way captures the assumption that the top knows the best ways to invest. Moreover, the investment function in the short-run is given and it is determined by past decisions. In the long-run, the firms have the desired investment, a positive function of net profit⁶ rate, the fraction of the profits retained and capacity utilization. Then, the investment is determined by this rate and by deviations of past investment. In other words, the firms have a function that makes the investment move to its desired investment. In the short-run, a rise in investment and in rests' share of capital stock increases the utilization. An increase of interest rate of the loans, a reduction of the fraction of profits retained by firms and the rise of wage-share also increase the utilization, since the investment function in the short-run is given, i.e., the profit-led effect is not possible. Besides that, a rise of propensities to consume also increases the capacity utilization.

In the long-run, the rise of wage share increase or decrease the utilization, since the change in profit share increases the desired investment. In other words, in spite of the economy in short-run is wage-led demand, in the long-run, the economy can be wage-led or profit-led demand. Besides that, the effect on wealth distribution is also ambiguous. It happens because the accumulation might increase more than the rise in rests' income, raising the top's capital further than the rests' capital. An increase in the fraction of profits retained and in the interest rate of loans has the same effect as the rise in wage-share, i.e., it is ambiguous.

3 ACCOUNTING FRAMEWORK

The accounting framework of this model is inspired in Palley (2012) and Godley and Lavoie (2007). Unlike the first, our model has three classes: two classes of workers and the capitalists. The workers are separated by their skills that impact their wages, $W_{i,t}$. Actually, the wages are related with the productivity of the sector where he or she works⁸. In this model proposed in this paper, we will call low skilled worker and high skilled worker. This difference allows us to understand the limits of redistribution of wages in demand, as in income and wealth distribution.

Capitalists and firms are one single class. Then, the capital stock is just owned by capitalists. Likewise Godley and Lavoie (2007), our model introduces public bonds, $B_{i,t}$, which every time generated financial income by an interest rate, r_t . These bonds are issued by the government, and high skilled workers and capitalists purchase it. Public bonds that are not bought by households are purchased by Central Bank. Then the wealth distribution is characterized by financial wealth, bonds and money, $D_{i,t}$.

The model considers a government sector that taxes wages, the income of bonds, profits and

⁶ The net profit is the output of the economy, without the wages and the payments to the loans.

⁸ Remark that here we are not talking about managerial class.

wealth with the rates, $\tau_{W,t}$, $\tau_{B,t}$, $\tau_{\pi,t}$ and $\tau_{V,t}$, respectively. The government, unlike Godley and Lavoie (2007), uses these taxes in order to decide its expenditure. Besides that, the economy is closed, producing one only good. Firms produce according to effective demand with a capital and labor through a fixed coefficient technology. The price is normalized in one, i.e, the variables are real. Finally, productivity is constant

The accounting framework of the model is given by the balance sheet and transactions matrices shown in tables 1 and 2. The subscripts l, h and c denote respectively the low skilled worker, the high skilled worker and the capitalist. For example, the second column in table 2 says that the low skilled workers, $L_{l,t}$, earn wages, $W_{l,t}$, and his all their disposable income is consumed, $C_{l,t}$. The fourth and sixth columns in the Table 2 indicate that high skilled workers, $L_{h,t}$, and capitalists have two sources of income: both earn from their public bonds, but the first earns wages, $W_{h,t}$, and the latter earn profits, $(1 - \psi_{W,t})Y_t$. These two classes save out of income, accumulating financial wealth each period, as it can be seen in table 1.

Tabela 1 – Sheet Matrix

Estoques	Famílias			Governo	Banco Central	Total
	Trabalhadores menos qualificados	Trabalhadores Mais Qualificados	Capitalistas/Firmas			
Moeda	0	D_h	D_c		$-D$	0
Títulos Públicos	0	B_h	B_c	$-B$	B_{cb}	0
Estoque de Capital			K			K
Total		V_h	$V_c + K$	$-B$		$B_{cb} - D + K$

Transactions Matrix

Flow	Families				Government
	Low Skilled Workers	High Skilled Workers	Capitalist Firms	Capital	
Consumption					
Investment					
Government Expenditure					
Wages	$+W_L A_{L,t}$	$+W_H A_{H,t}$	$-(W_L A_{L,t} + W_H A_{H,t})$		
Interest		$+r_t B_{H,t-1}$	$+r_t B_{C,t-1}$		
Taxes	$-W_L A_{L,t} \tau_{w,t}$	$-(\tau_{w,t} W_H A_{H,t} + \tau_{w,t} \sigma_t B_{H,t-1} + \tau_{w,t} V_{H,t-1})$	$-(\tau_{w,t} (1 - \lambda_{w,t}) Y_t + \tau_{w,t} \sigma_t B_{H,t-1} + \tau_{w,t} V_{H,t-1})$		
Money		$-\Delta D_{H,t}$	$-\Delta D_{C,t}$		
Bonds		$-\Delta B_{H,t}$	$-\Delta B_{C,t}$		
Total	0	0	0	$+\Delta D_{C,t}$ $+\Delta B_{C,t}$ $\Delta(D_{C,t} + B_{C,t})$	$-G_t, \epsilon$ T_t ΔD_t ΔB_t 0
				$+I_t$	
				$+\Delta D_{C,t}$ $+\Delta B_{C,t}$ $\Delta(D_{C,t} + B_{C,t}) + I_t$	

4 THE MODEL

4.1 Households

The income is distributed between the workers, who receive wages, $Y_{W,t} = W_{l,t}L_{l,t} + W_{h,t}L_{h,t}$, and capitalists who earn profits, $Y_{\pi,t} = (1 - \psi_{W,t})Y_t$. Thus, $Y_t = Y_{W,t} + Y_{\pi,t}$ ⁹

4.1.1 Low Skilled Workers

The low skilled workers receive income from wages and fully consume it, compatible with the classical assumption. Nevertheless, part of the wage income is appropriated by the government through a tax rate, $\tau_{W,t}$.

$$Y_{Dl,t} = C_{l,t} = (1 - \tau_{W,t})\psi_{W,t}\psi_{L,t}Y_t \quad (1)$$

So that, $\psi_{L,t}$ is the fraction of low skilled workers' wages in the total income out of wages, $Y_{W,t}$, in time t .

4.1.2 High Skilled Workers

The high skilled workers represent the workers who have a higher salary, that is, $W_{h,t} > W_{l,t}$, because they are in more productive jobs. The government taxes the income of wages and of public bonds by $\tau_{W,t}$ and $\tau_{B,t}$ rates, respectively. Aside from it, the government also taxes the previous financial wealth, $V_{h,t-1}$, by a $\tau_{V,t}$ rate.

$$Y_{Dh,t} = (1 - \tau_{W,t})(1 - \psi_{L,t})\psi_{W,t}Y_t + r_t(1 - \tau_{B,t})B_{h,t-1} - \tau_{V,t}V_{h,t-1} \quad (2)$$

Due to this higher income, this class consumes part of the disposable income, i.e., they have a propensity to consume out of disposable income, $\beta_{h,t}$, less than one. Finally, consumption decisions are sensitive, $\theta_{h,t}$, to personal wealth.

$$C_{h,t} = \beta_{h,t}Y_{Dh,t} + \theta_{h,t}V_{h,t-1} \quad (3)$$

$$S_{h,t} = C_{h,t} - Y_{Dh,t} \quad (4)$$

As in Godley and Lavoie (2007), the high skilled workers' wealth is the sum of the wealth accumulated in the previous period with current saving. The allocation of wealth, $V_{h,t}$, in money,

⁹ According to Godley and Lavoie (2007), interest payments on government debt are transfer payments, not part of income.

$D_{h,t}$, and in public bonds, $B_{h,t}$, is reviewed at each period and depends on the interest rate, r_t , of the high workers' disposable income and wealth, and on the exogenous parameter.

$$V_{h,t} = V_{h,t-1} + S_{h,t} \quad (5)$$

$$\frac{B_{h,t}}{V_{h,t}} = \lambda_{0,h,t} + \lambda_{1,h,t} r_t - \lambda_{2,h,t} \frac{Y_{Dh,t}}{V_{h,t}} \quad (6)$$

$$V_{h,t} = B_{h,t} + D_{h,t} \quad (7)$$

So that $\lambda_{0,h,t} > 0$, $\lambda_{1,h,t} > 0$, $\lambda_{2,h,t} > 0$

4.1.3 Capitalists/Firms

The capitalists make their decisions in the following sequence: i) Invest, I_t . ii) Consume, $C_{c,t}$ iii) Allocate their wealth in money, $D_{c,t}$, and public bonds, $B_{c,t}$.

According to Rowthorn (1981) and Dutt (1984), the gross investment is a positive function of the capital stock, the level of profits, and the output. However, the capital stock depreciates by ξ rate.

$$I_t = \gamma_{0,t} K_{t-1} + \gamma_{1,t} (1 - \Psi_{W,t}) Y_t + \gamma_{2,t} Y_t \quad (8)$$

So that, $\gamma_{0,t} > 0$, $\gamma_{1,t} > 0$ and $\gamma_{2,t} > 0$

Capitalists earn profits from firms, which are taxed by the government through a $\tau_{\pi,t}$ rate. Aside from it, the government also taxes financial income and previous financial wealth, $V_{c,t-1}$.

$$Y_{Dc,t} = (1 - \tau_{\pi,t})(1 - \Psi_{W,t}) Y_t + r_t (1 - \tau_{B,t}) B_{c,t-1} - \tau_{V,t} V_{c,t} - I_t \quad (9)$$

Since capitalists have a higher income than high skilled workers, his propensity to consume out of disposable income is less than workers, i.e, $\beta_c < \beta_h < 1$. Moreover, capitalists' consumption decision, in the same way as in the high skilled workers, is sensitive to the size of their wealth, represented by θ_c , which is lower or equal than θ_h .

$$C_{c,t} = \beta_{c,t} Y_{Dc,t} + \theta_{c,t} V_{c,t-1} \quad (10)$$

$$S_{c,t} = Y_{Dc,t} - C_{c,t} \quad (11)$$

Capitalists accumulate wealth over time, allocating it in public bonds, $B_{c,t}$, which yield interest, r_t , at each period, and in money, $D_{c,t}$. Capitalists' wealth allocation is reviewed at each

period and depends on the interest rate, r_t , on their disposable income and wealth, and on an exogenous parameter.

$$V_{c,t} = V_{c,t-1} + S_{c,t} \quad (12)$$

$$\frac{B_{c,t}}{V_{c,t}} = \lambda_{0,c,t} + \lambda_{1,c,t} r_t - \lambda_{2,c,t} \frac{Y_{Dc,t}}{V_{c,t}} \quad (13)$$

$$V_{c,t} = B_{c,t} + D_{c,t} \quad (14)$$

4.2 Central Bank

Central Bank is the residual purchase of public bonds. Then it will purchase all public bonds issued by the government, B_s , that high skilled workers and capitalists do not want to hold given the interest rate. Besides that, the Central Bank's government receives all of Central Bank's profit. Then, all government interest payments in public bonds of central bank balance have compensation in profits.

$$B_{cb,t} = B_{s,t} - B_{h,t} - B_{c,t} \quad (15)$$

$$r_t = \bar{r}_t \quad (16)$$

4.3 Government

Government's expenditure plus its payments in interest out of public bonds need to be compensated by taxes, by the issue of new bonds or by the Central Bank's profit. Besides that, the decision of the government expenditure is determined by an exogenous parameter, ω_t , which represents a target of a proportion of the fiscal deficit and the total income. For this reason, government expenditure is endogenous.

$$G_t + r_t(B_{h,t-1} + B_{c,t-1} + B_{cb,t}) = T_t + \Delta B_t + r_t B_{cb,t} \quad (17)$$

$$G_t = \omega_t Y_t + T_t \quad (18)$$

$$G_t = \tau_{W,t} \psi_{W,t} Y_t + \tau_{\pi,t} (1 - \psi_{W,t}) Y_t + r_t \tau_{B,t} (B_{h,t-1} + B_{c,t-1}) + \tau_{V,t} (V_{h,t-1} + V_{c,t-1}) + \omega_t Y_t \quad (19)$$

5 SHORT-RUN EQUILIBRIUM

The short-run solution involves solving the capacity utilization, u , supposing market equilibrium of goods. Aside from the capital stock and its previous period growth, K and $g_{k,t-1}$, the financial wealth, V_h and V_c , and households bonds, B_h and B_c , which are endogenous variables, the others variables are exogenous. Consequently, utilization is determined by fiscal deficit, ω , by the function distribution of income, Ψ_W , by the proportion of the low skilled wages in the total wages, Ψ_L , by the tax rates of wages, τ_W , of profits, τ_π , of financial income, τ_B , of financial wealth, τ_V , by the propensities to consume out of disposable income, β_h and β_c , by the propensities to consume out of wealth, θ_h and θ_c , by the parameters in the investment function, γ_0 , γ_1 and γ_2 , the rate of interest, r , and by the capital output-ratio, v .

$$DA = Y_t = C_t + I_t + G_t = C_{l,t} + C_{h,t} + C_{c,t} + I_t + G_t \quad (20)$$

$$u^* = u_{sr}(\beta_{h,t}, \beta_{c,t}, \theta_{h,t}, \theta_{c,t}, \gamma_{0,t}, \gamma_{1,t}, \gamma_{2,t}, \tau_{W,t}, \tau_{\pi,t}, \tau_{B,t}, \tau_{V,t}, \Psi_{W,t}, \Psi_{L,t}, \omega_t, r_t, v, B_{h,t-1}, B_{c,t-1}, V_{h,t-1}, V_{c,t-1}) \quad (21)$$

So that, $u = \frac{Y_t}{Y_t^{FC}}$, Y_{FC} is full capacity output and v is the capital-output ratio.

Assuming that the model has Keynesian Stability, reactions in savings must be greater than the investment to changes in capacity, i.e. $\frac{\partial S_t}{\partial u_t} > \frac{\partial I_t}{\partial u_t}$.

Then,

$$\Psi_{W,t}(\Psi_{L,t} + (1 - \Psi_{L,t})(\beta_{h,t}(1 - \tau_{W,t}) + \tau_{W,t})) + (1 - \Psi_{W,t})(\beta_{c,t}(1 - \tau_{\pi,t}) + \tau_{\pi,t} + \gamma_{1,t}(1 - \beta_{c,t})) + \gamma_{2,t}(1 - \beta_{c,t}) + \omega_t < 1 \quad (22)$$

Table 3 summarizes the effects of shocks on utilization. The last parameter is indicative of wealth distribution, $\phi_{V,t} = \frac{V_{h,t}}{V_{h,t} + V_{c,t}}$. So if it rises high skilled workers hold a bigger proportion of financial wealth.

The short-run utilization has a positive dependence of propensities to consume out of disposable income, β_h and β_c , and to consume out of wealth, θ_h and θ_c . Then the paradox of thrift holds. The distribution of income of wages, Ψ_L , through the poorer class has a positive impact on utilization since this class has a higher propensity to consume. In the same way, an increase in high skilled workers' share of total financial wealth, ϕ_V , also increases utilization. Regarding the taxes, the effects are positive because the decrease in the total consumption is smaller than the increase in government expenditure since any increase in taxes has a proportional impact on government consumption. The increase in the interest rate increases utilization as a result of a rise in disposable income of high skilled workers and of capitalists.

Tabela 2 – Shocks in exogenous variables in utilization

	u^*
ω_t	+
$\tau_{W,t}$	+
$\tau_{\pi,t}$	+
$\tau_{B,t}$	+
$\tau_{V,t}$	+
$\beta_{h,t}$	+
$\beta_{c,t}$	+
$\theta_{h,t}$	+
$\theta_{c,t}$	+
$\gamma_{0,t}$	+
$\gamma_{1,t}$	+
$\gamma_{2,t}$	+
r_t	+
$\psi_{W,t}$	+/-
$\psi_{L,t}$	+
$\phi_{V,t}$	+

However, the impact of changes on the function distribution of income, ψ_W , is ambiguous on utilization. The increase in the proportion of wages in total income has a positive impact on utilization when:

$$\psi_{L,t} + (1 - \psi_{L,t})(\beta_{h,t}(1 - \tau_{W,t}) + \tau_{W,t}) > \beta_{c,t}(1 - \tau_{\pi,t}) + \tau_{\pi,t} + \gamma_{1,t}(1 - \beta_{c,t}) \quad (23)$$

The inequality shows that an increase in wage share increase more workers consume and tax revenue out of wages than decrease capitalists' consume, the investment and the tax revenue out of profits. When (23) holds, the demand regime is wage-led. Otherwise, the demand regime is profit-led

6 LONG-RUN

6.1 Introduction

In the short-run the stocks were determined. In this section, the level of stocks can change and the state-state long-run is achieved when the stocks grow at the same rate. In order to understand the long run dynamics, output was separated in four sources of demand: i) stocks; ii) wage share and wage distribution (hereinafter wages and profits); iii) financial income; iv) induced by demand.

The first is associated with families' consumption out of wealth, government expenditure out of wealth taxes and investment induced by previous capital stock. This part fraction shows

the impact of each class's wealth on output.

$$Y_{s,t} = V_{h,t-1}(\theta_{h,t} + \tau_{V,t}(1 - \beta_{h,t})) + V_{c,t-1}(\theta_{c,t} + \tau_{V,t}(1 - \beta_{c,t}) + \tau_{V,t}) + \gamma_{0,t}(1 - \beta_{c,t})K_{t-1} \quad (24)$$

The second is associated with families' consumption out of wages and profits, government expenditure out of wages and profits, and investment induced by the level of profits. Since wage share and wages distribution impact workers and capitalists income, this fraction shows how these variables impact the output. Note that the effects are not dynamics, because the variables, with the exception of output, do not change on long-run.

$$Y_{wp,t} = (\Psi_{W,t}((1 - \tau_{W,t})\Psi_{L,t} + \beta_{h,t}(1 - \tau_{W,t})(1 - \Psi_{L,t}) + \tau_{W,t}) + (1 - \Psi_{W,t})(\beta_{c,t}(1 - \tau_{\pi,t}) + \tau_{\pi,t} + \gamma_{1,t}(1 - \beta_{c,t})))Y_t + \quad (25)$$

The third is associated with families' consumption out of financial income and government expenditure out of financial income taxes. It should be emphasized that this fraction is directly associated with the first fraction, stocks. Therefore, Wealth can impact aggregate demand in four ways: i) consumption out of wealth; ii) government expenditure out of wealth taxes; iii) consumption out of financial income; iv) government expenditure out of financial income taxes.

These two sources of demand indicate how wealth has a feedback effect on output. The families, by saving a share of their income, increase their financial wealth. In the next periods, these unused income rises demand both by increasing their financial income and the increase in the consumption out of wealth.

$$Y_{fi,t} = r_t(B_{h,t-1}(\beta_h(1 - \tau_{B,t}) + \tau_{B,t}) + B_{c,t-1}(\beta_c(1 - \tau_{B,t}) + \tau_{B,t})) \quad (26)$$

The fourth is associated with the target of fiscal in proportional of total income and investment induced by demand. In this fraction, as the second fraction, wages and profits, the variables do not change in the long-run, with the exception of output. The separate on two components is done to help the understanding the differences between distributional variables and output induced variables.

$$Y_{i,t} = (\omega_t + \gamma_{2,t}(1 - \beta_{c,h}))Y_t \quad (27)$$

This rest of the section describes the dynamics equations of stocks. Then, after some parameters are chosen, the initial values are computed supposing a steady growth, $g_{k,t} = g_{k,t-1}$. This values allow us to simulate some shocks on the following variables: propensities to consume out of disposable income, β_h , β_c , propensities to consume out of wealth, θ_h , θ_c , wage distribution, Ψ_L , wage share, Ψ_W , interest rate, r , fiscal deficit target, ω , and tax rate of wealth, τ_V . These experiments help to understand the correlations and causalities between utilization, high skilled workers' share of financial wealth and workers' share of total income.

6.2 Dynamics Equations

It was determined the dynamic equations of capital stock growth (28); government debt(29); financial wealth of high skilled workers((30)) and capitalists(32); public bonds held by the central bank(35), high skilled workers(33) and capitalists(34); and, normalized by the capital stock at the beginning of the period, K_{t-1} .

$$g_{k,t} = \gamma_{0,t} - \xi + (\gamma_{1,t}(1 - \psi_{W,t}) + \gamma_{2,t}) \frac{u^*}{v} \quad (28)$$

So that, $g_{k,t} = \frac{I_t}{K_{t-1}} - \xi$

It can notice that the growth rate of capital stock depends positively on the animal spirit and on the level of utilization, u , while depends negatively on wage share and rate of depreciation of capital stock

Substituting (18) and (15) in (17)

$$b_{s,t} = \frac{b_{s,t-1} - r_t b_{cb,t-1}}{1 + g_{k,t-2}} + \omega_t \frac{u^*}{v} \quad (29)$$

So that, $b_{s,t} = \frac{B_{s,t}}{K_{t-1}}$ and $b_{cb,t} = \frac{B_{cb,t}}{K_{t-1}}$.

The supply of public bonds, $b_{s,t}$, depends positively on the previous supply of public bonds, $b_{s,t-1}$, on interest rate and on the target of fiscal deficit, ω . However, it is negatively related with Central Bank public bonds.

Substituting (2) and (3) in (4), and it in (5) and normalizing:

$$v_{h,t} = \frac{v_{h,t-1}(1 - \theta_{h,t} - \tau_{v,t}(1 - \beta_{h,t})) + b_{h,t-1}(1 - \beta_{h,t})r_t(1 - \tau_{B,t})}{1 + g_{k,t-2}} + (1 - \beta_{h,t})\psi_{W,t}(1 - \psi_{L,t})(1 - \tau_{W,t}) \frac{u^*}{v} \quad (30)$$

So that $v_{h,t} = \frac{V_{h,t}}{K_{t-1}}$

High skilled workers' financial wealth is a positive function of high skilled workers savings. For this reason, any increase in their disposable income increases their wealth. Then, this stock depends positively on high skilled workers' public bonds in the previous period, $b_{h,t-1}$, on the interest rate, r , on the wage share, ψ_W , and on the utilization, u . A high share of low skilled workers' wages in total income out of wages, ψ_L , a little tax rate of wealth, τ_V , of financial income, τ_B , and of wages income, τ_W , drop high skilled workers' financial wealth. Finally, a larger high skilled workers' propensity to consume out of disposable income, β_h , and out of wealth, θ_h impact negatively the accumulation of high skilled workers' wealth.

Substituting (9) and (10) in (11), and it in (12) and normalizing:

$$v_{c,t} = \frac{v_{c,t-1}(1 - \theta_{c,t} - \tau_{v,t}(1 - \beta_{c,t})) + b_{c,t-1}(1 - \beta_{c,t})r_t(1 - \tau_{B,t})}{1 + g_{k,t-2}} + (1 - \beta_{c,t})(((1 - \psi_{W,t})((1 - \tau_{\pi,t}) - \gamma_{1,t}) - \gamma_{2,t})\frac{u^*}{v} - \gamma_{0,t}) \quad (31)$$

Substituting (2) in (6), and normalizing:

$$v_{c,t} = \frac{v_{c,t-1}(1 - \theta_{c,t} - \tau_{v,t}(1 - \beta_{c,t})) + b_{c,t-1}(1 - \beta_{c,t})r_t(1 - \tau_{B,t})}{1 + g_{k,t-2}} + (1 - \beta_{c,t})(((1 - \psi_{W,t})((1 - \tau_{\pi,t}) - \gamma_{1,t}) - \gamma_{2,t})\frac{u^*}{v} - \gamma_{0,t}) \quad (32)$$

So that $V_{c,t} = \frac{V_{c,t}}{K_{t-1}}$

For the same reason of high skilled workers, capitalists' financial wealth is a positive function of capitalists' savings. Therefore any increase in their disposable income increases their wealth. Then, this stock depends positively on capitalists' public bonds in the previous period, $c_{h,t-1}$, on the interest rate, r and on the rate of utilization, u . A high wage share, ψ_W , and a high tax rate of wealth, τ_V , of financial income, τ_B , and of profits, τ_π , drop capitalists' financial wealth. A capitalists' propensity to consume out of disposable income, β_h , and out of wealth, θ_h impact negatively the accumulation of capitalists' wealth.

Substituting (2) em (6), e normalizing:

$$b_{h,t} = (\lambda_{0,h,t} + r_t \lambda_{1,h,t})v_{h,t} - \lambda_{2,h,t}(\psi_{W,t}(1 - \psi_{L,t})(1 - \tau_{W,t})\frac{u^*}{v} + \frac{r_t(1 - \tau_{B,t})b_{h,t-1} - \tau_{V,t}v_{h,t-1}}{1 + g_{k,t-2}}) \quad (33)$$

So that $b_{h,t} = \frac{B_{h,t}}{K_{t-1}}$

High skilled workers' public bonds, B_h , depends whether their behavior is compatible with Friedman (1957), or not. If they are anti-Friedman, a higher disposable income drops the allocation of wealth in public bonds. However, in steady-state, an increase of disposable income must rise high skilled workers' public bonds, since a higher disposable income increases high skilled workers' wealth.

Substituting (9) in (13) and normalizing:

$$b_{c,t} = (\lambda_{0,c,t} + r_t \lambda_{1,c,t})v_{h,t} - \lambda_{2,c,t}(((1 - \psi_{W,t})((1 - \tau_{\pi,t}) - \gamma_{1,t}) - \gamma_{2,t})\frac{u^*}{v} - \gamma_{0,t} + \frac{r_t(1 - \tau_{B,t})b_{c,t-1} - \tau_{V,t}v_{c,t-1}}{1 + g_{k,t-2}}) \quad (34)$$

So that $b_{c,t} = \frac{B_{c,t}}{K_{t-1}}$

The level of capitalists' public bonds also depends on their behavior. If capitalists behavior is Friedman, a higher disposable income increases the allocation of wealth in public bonds. Then the effects of shocks on variables are the same as on (32).

Finally, replacing (34), (??) and (29) in (15) and normalizing:

$$b_{cb,t} = b_{s,t} - b_{h,t} - b_{c,t} \quad (35)$$

So that $b_{c,t} = \frac{B_{c,t}}{K_{t-1}}$

6.3 Simulations

From a steady state growth, i.e. $g_{k,t} = g_{k,t-1}$, the initial values of experiments were computed. In an effort to understand the effects of different shocks on the endogenous and distributive variables, the experiments will be separated in the two options of demand regimes that were shown in the fifth section: i) wage-led, when the rise in wage share has a positive impact on short-run utilization, and ii) profit-led, when the rise in a wage share has a negative impact on short-run utilization.

The steady state growth that is compatible with a short-run profit-led economy was achieved after beginning in a wage-led economy² and changes in the following exogenous variables: propensity to consume out of high skilled workers, β_h , wage and profit taxes, τ_W and τ_π , the investment parameter sensible to profit rate, γ_1 , and in the proportion of low skilled wages in total wages, ψ_L , as Table 4 shows. Then, $\psi_{L,t} + (1 - \psi_{L,t})(\beta_{h,t}(1 - \tau_{W,t}) + \tau_{W,t}) < \beta_{c,t}(1 - \tau_{\pi,t}) + \tau_{\pi,t} + \gamma_{1,t}(1 - \beta_{c,t})$.

Table 3 presents the initial values normalized in both demand regimes. The values are different since the parameters were changed. Then, in one hand, the utilization, capital stock growth and capitalists' wealth and public bonds are higher in a wage-led. On the other hand, high skilled workers' wealth and public bonds are higher in a profit-led.

Then, in the rest of this section, there are simulated some shocks on the parameters in a wage-led economy. This demand regime was chosen because the initial values are compatible with this economy. However, in the shocks that the long-run effects are different, the profit-led economy will be also analyzed.

² The propensities to consume out of income was inspired from Leite (2014). The propensities to consume out of wealth is compatible with Catte et al. (2004), Boone, Giorno e Richardson (1998), Altissimo et al. (2005), Sousa (2009) e Barrell, Costantini e Meco (2015). Sousa (2009) e Altissimo et al. (2005), Zeldes (1989). Interest rate is according with long run interest rate in real values. Since it is larger than long-run growth, the target of fiscal deficit is negative. The wage share is compatible with Neto e Saboia (2014). Finally, the others parameters was chosen by the following rules: i) utilization rate should be around 0,8; ii) the proportions of government expenditure, families consumption and investment should be the same as National Accoutns in Brazil in 2017.

Tabela 3 – Parameters

	Wage-led	Profit-Led
ω_t	-0,02	-0,02
$\tau_{W,t}$	0,2	0,05
$\tau_{\pi,t}$	0,1	0,35
$\tau_{B,t}$	0,05	0,05
$\tau_{V,t}$	0,01	0,01
$\beta_{h,t}$	0,9	0,78
$\beta_{c,t}$	0,7	0,7
$\theta_{h,t}$	0,06	0,06
$\theta_{c,t}$	0,04	0,04
$\gamma_{0,t}$	0,0005	0,0005
$\gamma_{1,t}$	0,001	0,05
$\gamma_{2,t}$	0,18	0,18
r_t	0,04	0,04
$\Psi_{W,t}$	0,4	0,4
$\Psi_{L,t}$	0,6	0,1
ξ	0,037	0,037
$\lambda_{1,h,t}$	0,6	0,6
$\lambda_{2,h,t}$	0,6	0,6
$\lambda_{3,h,t}$	0,1	0,1
$\lambda_{1,c,t}$	0,8	0,8
$\lambda_{2,c,t}$	0,8	0,8
$\lambda_{3,c,t}$	0,1	0,1

Tabela 4 – Initial Values

	Wage-led	Profit-Led
u_t	0,8212	0,6607
$b_{h,t}$	0,028	0,158
$b_{c,t}$	0,52	0,225
$v_{h,t}$	0,053	0,029
$v_{c,t}$	0,65	0,28
$g_{k,t}$	0,022	0,018

6.3.1 High Skilled Workers' Propensity to Consume out of Disposable Income

A decrease of 5% in high skilled workers' propensity to consume out of disposable income, β_h , leads to a lower utilization on long-run. It happens because their wealth accumulation drops. Note that the higher utilization in short-run rises capitalists' wealth accumulation. However, as Figure 2 shows, the total effect on the fraction of stocks is negative, i.e, the fall in high skilled workers' consumption is larger than the rise in capitalists' consumption. The fall in the fraction of stocks and the small rise in the fraction of financial income drop the utilization. From then on, the fall in utilization decreases families disposables income, reducing even more the wealth accumulation. Then, although our model is demand-driven, the wealth effect is large enough to invalidate the paradox of thrift.

Figura 1 – The increase of 5% in high skilled workers’ propensity to consume out of disposable income ($\beta_{h,t}$) on the rate of utilization (u^*) and on high skilled workers’ share of total financial wealth($\phi_{V,t}$)

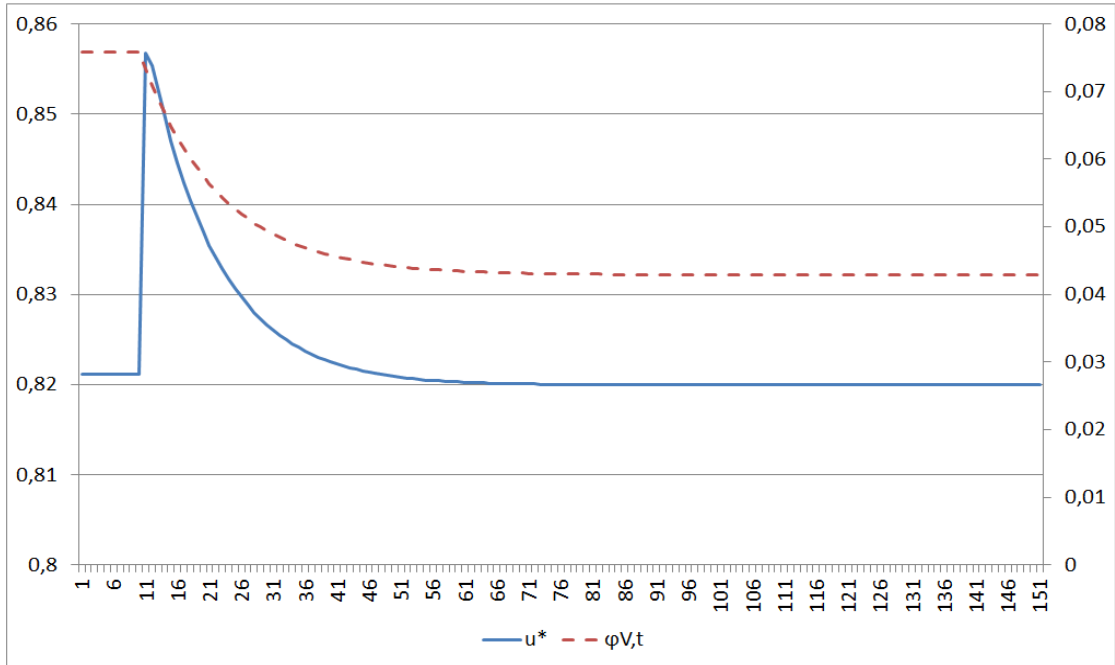


Figura 2 – The increase of 5% in high skilled workers’ propensity to consume out of disposable income ($\beta_{h,t}$) on the fraction of stocks, on the fraction of wages and profits, on the fraction of financial income and on the fraction induced by output normalized)

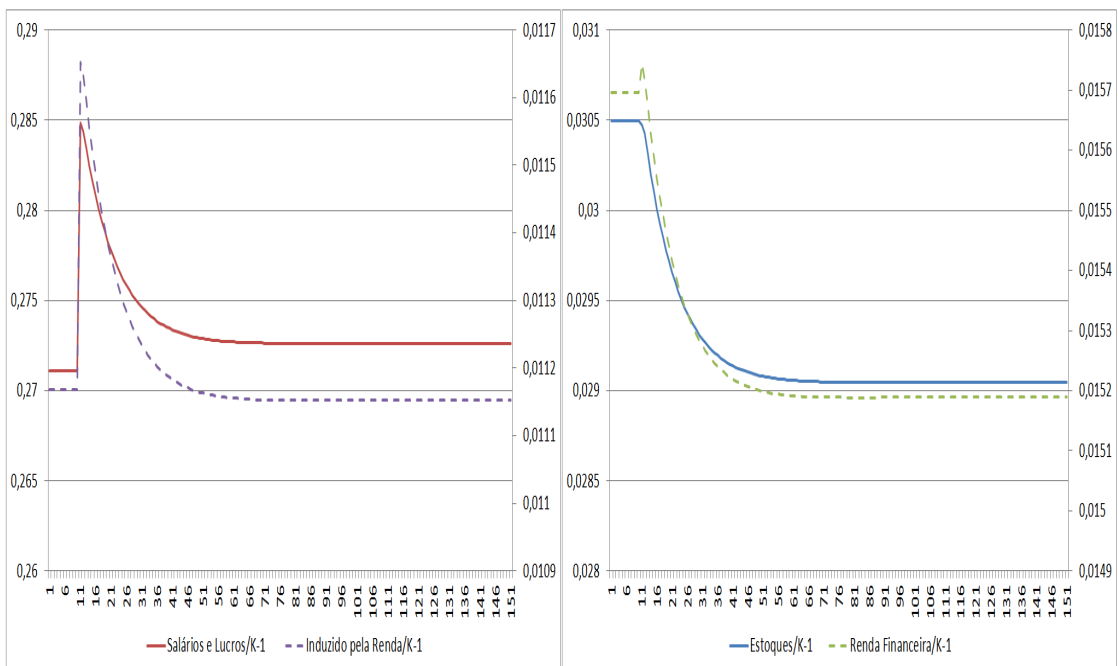
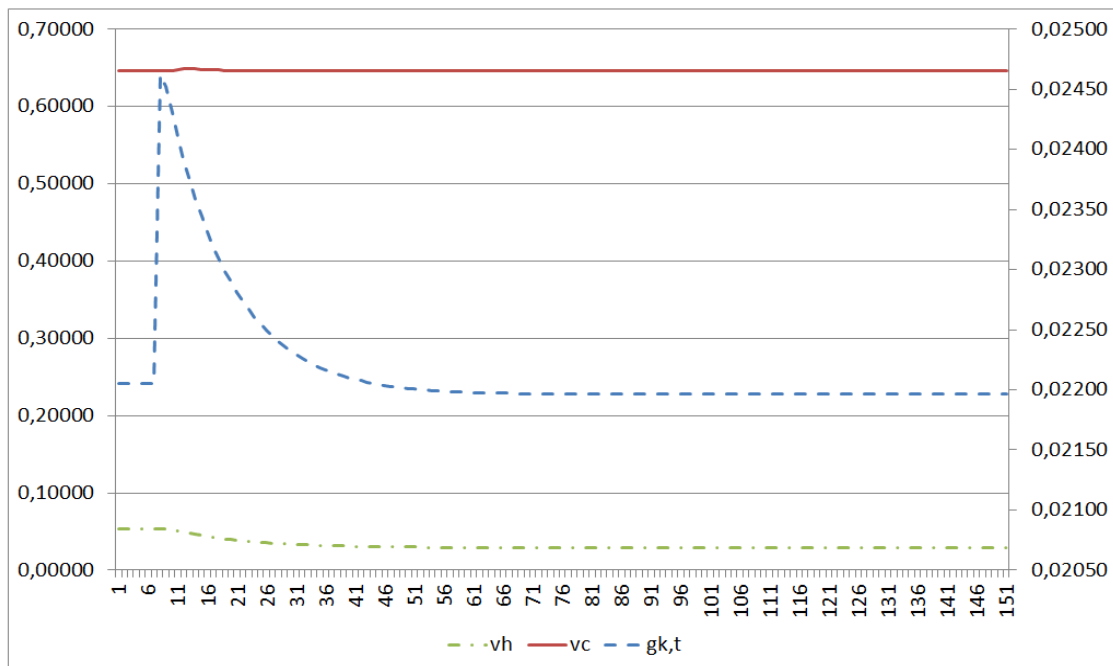


Figura 3 – The increase of 5% in high skilled workers’ propensity to consume out of disposable income ($\beta_{h,t}$) on high skilled workers’ financial wealth normalized ($v_{h,t}$), on capitalists’ financial wealth normalized ($v_{c,t}$) and on the growth of capital stock ($g_{k,t}$)



6.3.1.1 Profit-led demand regime and robustness

The effect on a profit-led economy, after an increase of high skilled workers’ propensity to consume out of disposable income, is the same as in a wage-led economy. The difference between both demand regimes is about the intensity. When the demand regime is profit-led, the utilization rises more in short-run and drops more in the long-run. The short-run effect occurs because high skilled workers have a higher disposable income in the profit-led economy. The long-run effect is a result of high skilled workers’ share of financial wealth is larger in this demand regime.

As developed in this experiment, it is the strong wealth effect that determines the long-run trajectory. Besides that, is the dominant effect of high skilled workers’ wealth accumulation over capitalists’ wealth accumulation that leads the rate of utilization to a lower level. Then, with the propose to give a robust in our results, some parameters could be altered.

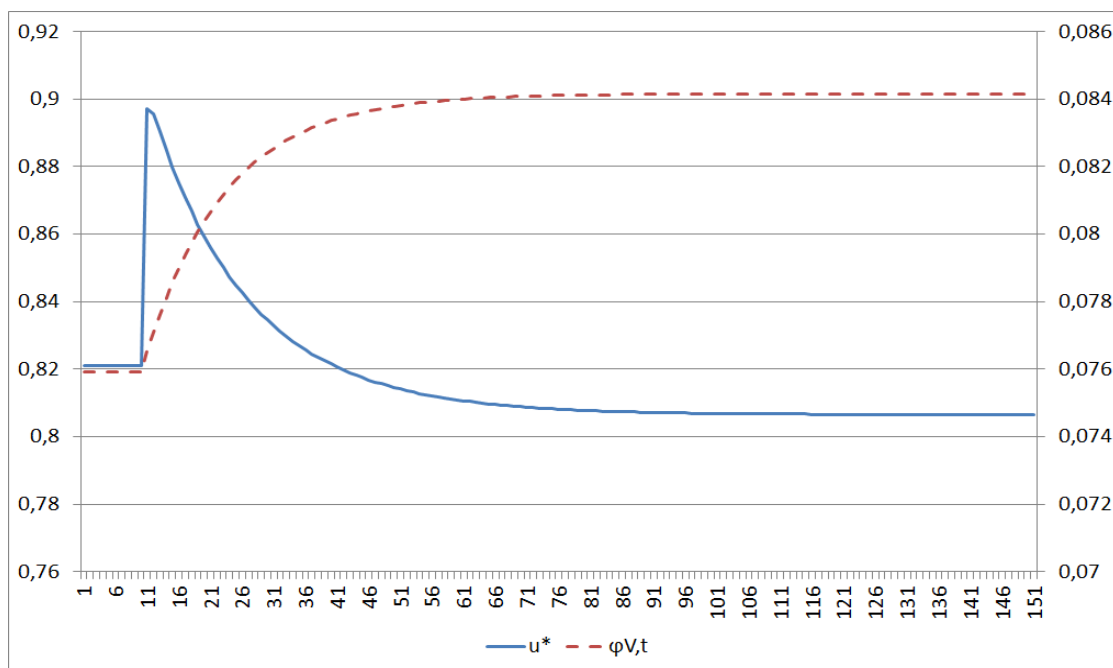
Increases in tax of wages, in tax of workers’ wealth and in workers’ propensity to consume out of wealth do not change the results. Decreases in tax of profits and in capitalists’ wealth also do not change the results. However, a fall in capitalists’ propensity to consume out of wealth to 0,022 (a reduction of 45%) is able to hold the paradox of thrift. In order to explain it, we need to return the four ways that wealth can impact utilization. Initially, a decrease in capitalists’ propensity to consume out of wealth rises their savings. Therefore, capitalists have

a larger wealth and public bonds in a long-run. Then, capitalists' consumption out of financial income and government expenditure rise. Consequently, the sum of the effects in each fraction of output is positive.

6.3.2 Capitalists' Propensity to Consume out of Disposable Income

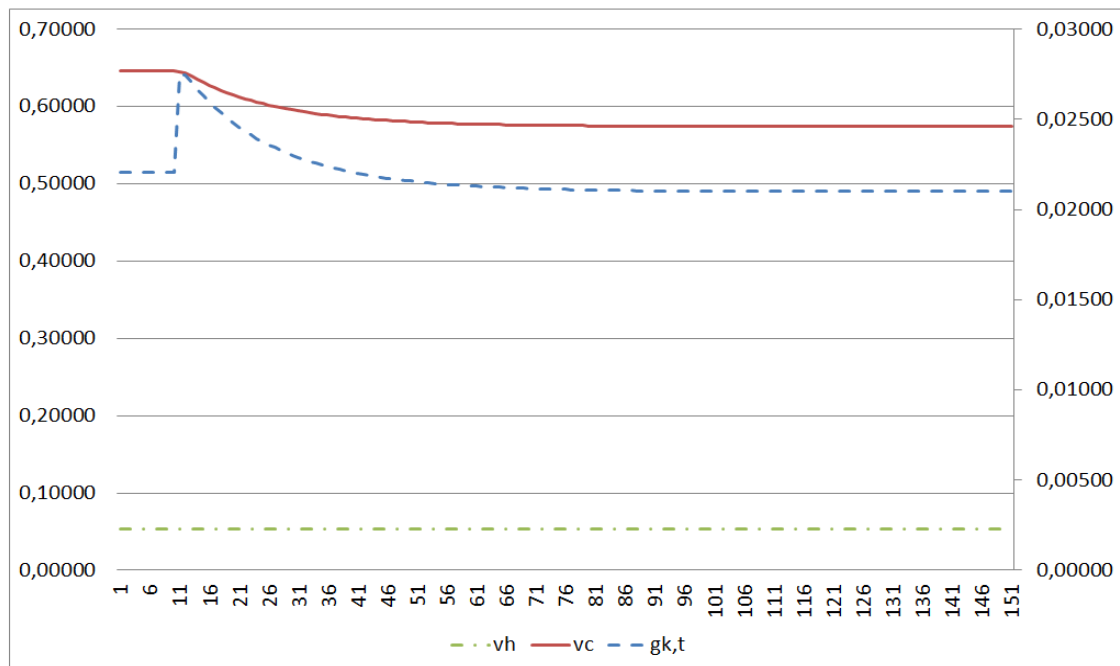
An increase in capitalists' propensity to consume out of disposable income, β_c , has a similar dynamic in utilization as a rise of high skilled workers' propensity to consume out of disposable income, β_h . In the long-run, the utilization is lower than it was before the shock. It occurs because of this increase in capitalists' propensity to consume out of disposable income drops capitalists savings, reducing their capacity to accumulate wealth.

Figura 4 – The increase of 5% in capitalists' propensity to consume out of disposable income ($\beta_{c,t}$) on the rate of utilization (u^*) and on high skilled workers' share of total financial wealth($\varphi_{V,t}$)



Finally, It must be highlighted the difference between the intensities after the shocks on high skilled workers' propensity to consume out of disposable income, β_h , and high capitalists' propensity to consume out of disposable income, β_c in utilization rate. Note from (24) that the fraction of stocks on output is negatively impacted by both propensities to consume. However, capitalists' propensity to consume out of disposable income also impacts the effect of capital stock on output because capitalists' disposable income is dependent of capital stock, as can be seen in (9). Moreover, its also happens in the fraction of wages and profits and in the fraction induced by output. Therefore, an increase in capitalists' propensity to consume out of

Figura 5 – The increase of 5% in capitalists’ propensity to consume out of disposable income ($\beta_{c,t}$) on high skilled workers’ financial wealth normalized ($v_{h,t}$), on capitalists’ financial wealth normalized ($v_{c,t}$) and on the growth of capital stock ($g_{k,t}$)



disposable income has a larger impact on utilization than an increase in high skilled workers’ propensity to consume out of disposable income.

6.3.2.1 Profit-led demand regime and robustness

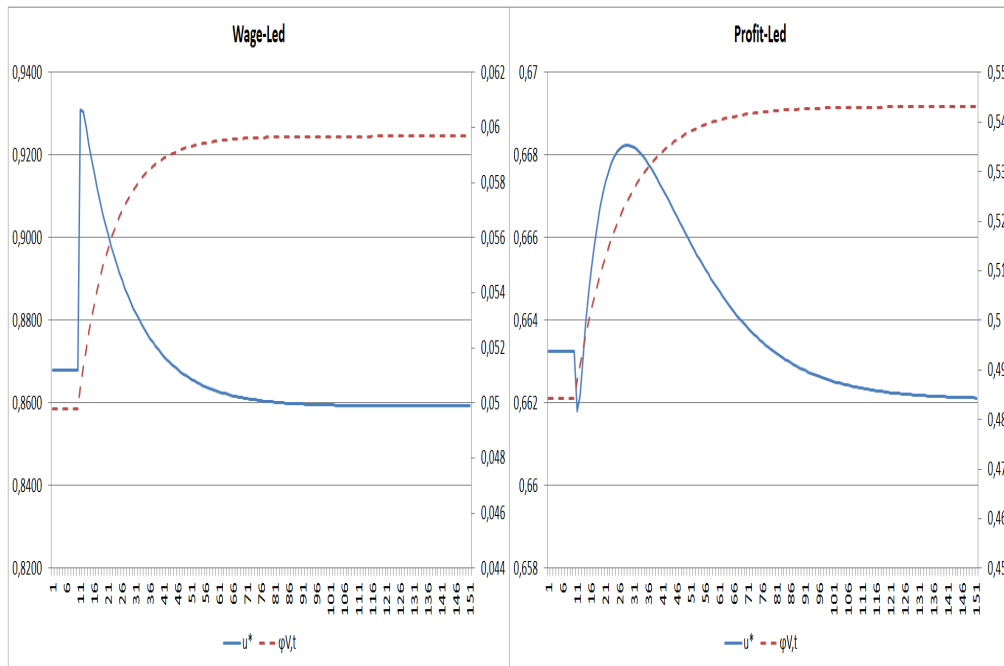
The effect on a profit-led economy, after an increase of capitalists’ propensity to consume out of disposable income, is the same as in a wage-led economy. The difference between both demand regimes, as after an increase in high skilled workers’ propensity to consume out of disposable income, is about the intensity. When the demand regime is wage-led, the utilization rises more in short-run and drops more in the long-run. The short-run effect occurs because capitalists have a higher disposable income in a wage-led economy. The long-run effect is a result of capitalists’ share on financial wealth is larger in this demand regime.

The increase in capitalists’ propensity to consume out of disposable income is robust to all results in both demand regimes. The paradox of thrift holds for any choice of parameters.

6.3.3 Wage Share

A 5% increase in wage share, ψ_W , has a negative effect, in the long-run, on utilization in both demand regimes. However, as Figure 12 shows, the trajectory of utilization is different in both demand regimes. For this reason, it will be analyzed separately.

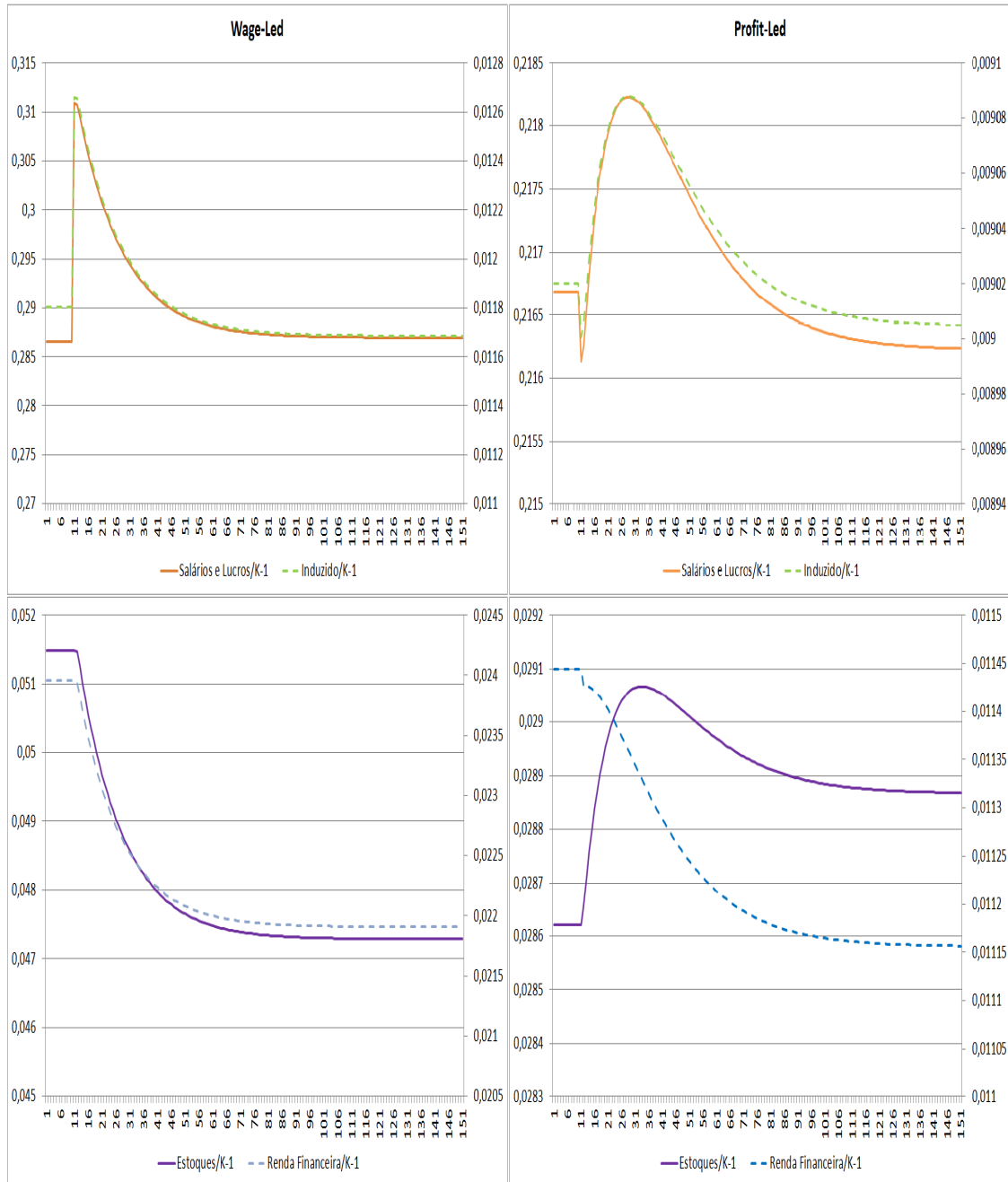
Figura 6 – The increase of 5% increase in wage share ($\psi_{W,t}$) on the rate of utilization (u^*) and on high skilled workers' share of total financial wealth($\phi_{V,t}$)



In a wage-led economy, in the period of the shock, the fraction of wages and profits increases. Since this fraction represents more than 80% of utilization, the output rises significantly. In the fraction of stocks (and of financial income), the increase of wage share has two consequences. On one hand, it increases high skilled workers consumption out of wealth, since their disposable income rises, expanding their accumulation of wealth. On the other hand, capitalists' consumption out of wealth decreases. As a result of capitalists' propensity to consume out of disposable income is lower than high skilled workers' propensity to consume out of disposable income, the total effect, in the period after the shock, in the fractions of stocks and the fraction of financial income in output is negative. Then, the rate of utilization decreases, even though it still higher than before the shock. However, this decrease leads to an intensification in the fall of the fractions of stocks and financial income. In the long-run, the feedback effect is strong enough to lead the rate of utilization lower than before the shock.

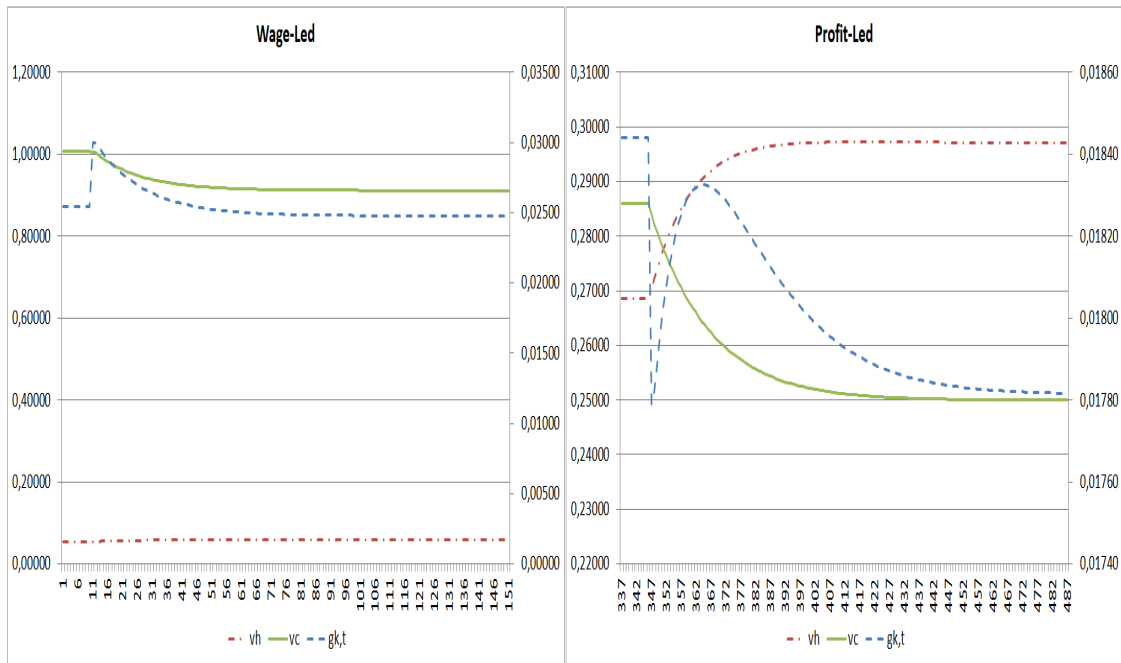
In a profit-led demand regime, although the fall in utilization in the period the shock, it increases in the next period, as Figure 12 shows. This reversal in the trajectory is a result of an increase in the fraction of stocks, offsetting the fall in the fraction of wages and profits. The fraction of stocks has this dynamic because the high skilled workers have a large portion of wealth and income in this demand regime. An increase in high skilled workers income has a significant impact on their wealth. Thus, the increase in wage-share has a huge impact on high skilled workers consumption. However, as in the wage-led demand regime, after some periods, the negative impact in capitalists' accumulation of wealth is more important to the fraction of

Figura 7 – The increase of 5% increase in wage share ($\psi_{W,t}$) on the fraction of stocks, on the fraction of wages and profits, on the fraction of financial income and on the fraction induced by output normalized



stocks than the positive effect on high skilled workers' wealth. This associated with the decrease in the fraction of financial income leads to a rate of utilization lower than the periods before the shock.

Figura 8 – The increase of 5% increase in wage share ($\psi_{W,t}$) on high skilled workers' financial wealth normalized ($v_{h,t}$), on capitalists' financial wealth normalized ($v_{c,t}$) and on the growth of capital stock ($g_{k,t}$)



6.3.3.1 Robustness

Note from the previous analysis that the negative effect in long-run utilization after an increase of 5% in the wage share is a consequence of a higher relevance of capitalists' accumulation of wealth than high skilled workers' accumulation of wealth. Then, in this subsection, we will change the parameters in order to increase high skilled workers' wealth or decrease this relevance.

In a wage-led economy, a decrease to zero in capitalists' propensity to consume out of wealth and in capitalists' tax rate of wealth smooth the fall in the rate of utilization (1,5% to 0,5%). It is important to reinforce that these change in the parameters, even though nullify direct the importance of capitalists' wealth on utilization, increases the relevance in the indirect importance of capitalists' wealth on output. It happens because capitalists' wealth rises, expanding their financial income. This change associated with a fall to zero in tax of capitalists' financial income also does not reverse the decrease in utilization. However, if we divide capitalists' propensity to consume out of disposable income, β_h , into two parts, one out of profits and other out

of financial income, and the latter falls to 0,02 (reduction of 97%), the utilization in long-run becomes wage-led the in long-run, i.e., the utilization becomes higher than before the shock.

In the profit-led economy, the changes in the parameters are smoother. In this demand regime, high skilled workers propensity to consume out of disposable income and tax rate of wages are lower than in the wage-led demand regime. Then their capacity to accumulate wealth is higher. Besides that, the opposite occurs to capitalists, since the tax rate of profits and the profits sensibility of investment are higher than in the wage-led demand. Then, the dynamic effect raises the importance of high skilled workers compared with capitalists. For this reason, the decrease in utilization after an increase in wage share is lower in the profit-led economy than in the wage-led.

Nonetheless, reductions to zero in capitalists' tax rate of wealth, in capitalists' propensity to consume out of wealth and in capitalists' tax rate of financial income do not change the previous result. However, if capitalists' propensity to consume out of *financial income* decreases to 0,66 (reduction of 10%), the economy becomes wage-led in long-run. Then, the wealth leads to a counter-intuitive result. Short-run profit-led demand regime has a higher tendency to be wage-led in long-run than short-led wage-led economies.

7 CONCLUSION

This paper, inspired by the Kaleckian approach analyzed the relations between the rate of firms' utilization, the high skilled workers' share of financial income and workers' share of net income distribution. The model indicates that Wealth can impact aggregate demand on four ways: i) consumption out of wealth; ii) government expenditure out of wealth taxes; iii) consumption out of financial income; iv) government expenditure out of financial income taxes.

In the short-run, the results are compatible with the literature Kaleckian, i.e, the paradox of thrift hold and a higher share of high skilled workers' wealth has a positive impact on capacity utilization. Besides that, an increase in wage-share has an ambiguous result in utilization, as Bhaduri e Marglin (1990) and Amadeo (1987). However, different from latter, this effect is not just a consequence of an introduction of a workers' positive propensity to save. In our model, the government taxes of wages and profits have an important role in the determination of the demand regime.

In the long-run, however, the results are divergent of traditional Kaleckian literature. An increase in the propensities to consume drops utilization, in spite of the model is demand-driven, which invalidates the paradox of thrift. Thus, we can affirm that the inclusion of a cumulative financial asset of savings held by two classes makes Pasinetti's Theorem (1962) invalid.

This result is different from Brochier e Silva (2018), which also develop a model with families holding public bonds. In Brochier e Silva (2018) wealth just impacts the aggregate demand

in one way, the propensity to consume out of wealth. In their model, the government expenditure is independent of taxes and the propensity to consume out of financial income is zero.

In our model, the paradox of costs does not hold in the long-run, different again from Brochier e Silva (2018). Moreover, since in profit-led demand regime high skilled workers' financial wealth is higher than in the wage-led, the high skilled workers' wealth is more important in the first demand regime. For this reason, paradoxically, the parameters to remain the paradox of costs in the long-run is more plausible in the profit-led than in the wage-led.

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